

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Transmittal Letter and the papers indicated as being transmitted therewith are being deposited with the United States Postal Service on this date shown below in an envelope as "Express Mail Post Office to Addressee" under the below indicated Mailing Label Number, addressed to: Box PCT, Assistant Commissioner for Patents, Washington, D.C. 20231.

Mailing Label No.: EF232844560US

Deposit Date: July 19, 2001
Don W. Bulson

Name: Don W. Bulson

ATTORNEY'S DOCKET No. DYOUP0218US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
(DO/EO/US)**

In re national phase of:

Applicant(s): David Horne et al.
International Application No.: PCT/GB00/00094
International Filing Date: 14 January 2000
Priority Date Claimed: 19 January 1999
Title of Invention: HINGE CONNECTION

**TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED
OFFICE (DO/EO/US) CONCERNING ENTRY INTO U.S. NATIONAL
PHASE UNDER 35 U.S.C. 371**

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information under 35 U.S.C. 371:

1. This express request to immediately begin national examination procedures (35 U.S.C. 371(f)).
2. The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees (37 CFR 1.492) as indicated below.

3. A copy of the International application (35 U.S.C. 371(c)(2)):
- a. ☒ is transmitted herewith
(International Publication No. WO 00/44076).
 - b. ☐ is not required, as the application was filed with the United States Receiving Office.
 - c. ☐ has been transmitted by the International Bureau. A copy of Form PCT/1B/308 is enclosed.
4. ☐ A translation of the International application into the English language (35 U.S.C. 371(c)(2)) is transmitted herewith.
5. Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. 371(c)(3)):
- a. ☐ are transmitted herewith.
 - b. ☐ have been transmitted by the International Bureau.
6. ☐ A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. 371(c)(3)) is transmitted herewith.
7. A copy of the international examination report (PCT/IPEA/409)
- a. ☒ is transmitted herewith.
 - b. ☐ is not required as the United States Patent and Trademark Office was the IPEA.
8. Annex(es) to the international preliminary examination report
- a. ☐ is/are transmitted herewith.
 - b. ☐ is not required as the United States Patent and Trademark Office was the IPEA.
9. ☐ A translation of the annexes to the international preliminary examination report is transmitted herewith.

09889685-03502

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 2. **DATE** _____
 3. **TIME** _____
 4. **LOCATION** _____
 5. **REASON** _____
 6. **WITNESSES** _____
 7. **SIGNATURE** _____
 8. **INITIALS** _____
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Transmittal Letter to United States Designated/Elected Office

Page 4

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| Basic National Fee | | | | | Fee |
| IPEA - US | | | | | \$690.00 |
| ISA - US | | | | | \$710.00 |
| PTO not ISA or IPEA | | | | | \$1,000.00 |
| Claims meet PCT Art. 33(1)-(4) - IPEA - US | | | | | \$100.00 |
| Filing with EPO or JPO search report | | | | | \$860.00 |
| Enter appropriate basic fee → | | | | | \$860.00 |
| Claims* | Number filed | | Number extra | Rate | |
| Total claims | 12 | -20 | 0 | \$18.00 | \$0.00 |
| Independent claims | 1 | -3 | 0 | \$80.00 | \$0.00 |
| Multiple dependent claims (if applicable) | | | | \$270.00 | |
| Total of above | | | | | \$860.00 |
| Small entity statement enclosed, 1 if Yes, 0 if No → | | | | 0 | \$0.00 |
| Total national fee | | | | | \$860.00 |
| Fee for recording enclosed assignment | | | | \$40.00 | |
| Total fees enclosed | | | | | \$860.00 |

*After any attached preliminary amendment reducing the number of claims and/or deleting multiple dependencies.

☒ [X] A check in the amount of \$ 860.00 to cover the above fees is enclosed.

☐ [] Please charge our Deposit Account No. 18-0988 in the amount of \$ _____. A duplicate copy of this sheet is enclosed.

WARNING: TO AVOID ABANDONMENT OF THE APPLICATION THE BASIC NATIONAL FEE MUST BE PAID WITHIN THE 20/30 MONTH TIME LIMIT.

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16. The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to our Deposit Account No. 18-0988:

a. ☒ 37 CFR 1.492(a)(1), (2), (3), (4) and (5) (filing fees)

WARNING: BECAUSE FAILURE TO PAY THE NATIONAL FEE WITHIN 30 MONTHS WITHOUT EXTENSION (37 CFR S 1.495(B)(2)) RESULTS IN ABANDONMENT OF THE APPLICATION, IT WOULD BE BEST TO ALWAYS CHECK THE ABOVE BOX.

b. ☐ 37 CFR 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

Respectfully submitted,



Don W. Bulson, Reg. No. 28,192

Direct all correspondence and telephone calls to:

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re national phase of:

Applicant: David Horne et al.
Appln. No.: PCT/GB00/00094
Filing Date:
Title: HINGE CONNECTION

Docket No.: DYOUP0218US

PRELIMINARY AMENDMENT DELETING MULTIPLE DEPENDENCIES

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please amend the application in the below indicated manner.¹

In the Claims:

Please amend claims 4, 5, 6, 8 and 11 as follows:

4. (Amended) A hinge connection according to claim 1, wherein the hinge arm (1) includes a main arm portion (11), and the spacing member (15) and the hinge pin (16) are integrally formed and rotatably mounted at an end of the main arm portion (11).

5. (Amended) A hinge connection according to claim 1, wherein the spacing member (15) is contiguous with the hinge pin (16).

6. (Amended) A hinge connection according to claim 1, wherein the hinge recess (2) includes guide surfaces (22, 231), and the corner is a groove defined by the

¹ The change(s) to the specification and/or claims are shown by underscoring and bracketing in the marked-up version attached hereto as an Appendix.

Attorney Docket No. DYOUP0218US

guide surfaces (22, 231), against which the hinge arm (1) is seated when in the first position.

8. (Amended) A hinge connection according to claim 6, wherein the guide surfaces (22, 231) are planar.

11. (Amended) An electrical cabinet for electronic and electrical components, comprising a hinge connection according to claim 1, and a frame including a frame member (31) including the hinge arm (1) and a removable door panel (32) including the hinge recess (2).

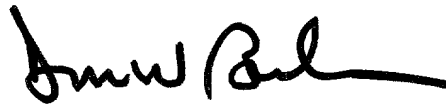
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Attorney Docket No. DYOUP0218US

Remarks

This amendment is being submitted to delete all multiple dependencies from the claims prior to calculation of the filing fee.

Respectfully submitted,



Don W. Bulson
Reg. No. 28,192

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Cleveland, Ohio 44115

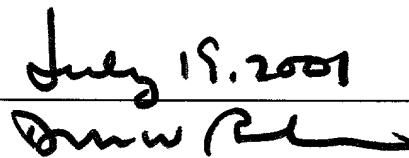
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Mailing Label No.: EF232844560US

Deposit Date: July 19, 2001



Name: Don W. Bulson

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APPENDIX

The change(s) to the specification and/or claims are below shown by underscoring and bracketing.

In the Claims:

Claims 4, 5, 6, 8 and 11 have been amended as follows:

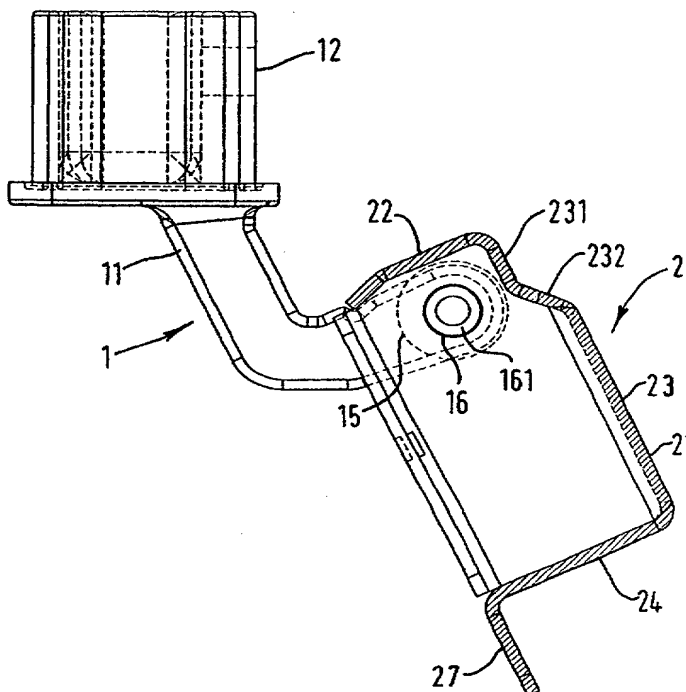
4. (Amended) A hinge connection according to [any of claims 1 to 3] claim 1, wherein the hinge arm (1) includes a main arm portion (11), and the spacing member (15) and the hinge pin (16) are integrally formed and rotatably mounted at an end of the main arm portion (11).

5. (Amended) A hinge connection according to [any of claims 1 to 4] claim 1, wherein the spacing member (15) is contiguous with the hinge pin (16).

6. (Amended) A hinge connection according to [any of claims 1 to 5] claim 1, wherein the hinge recess (2) includes guide surfaces (22, 231), and the corner is a groove defined by the guide surfaces (22, 231), against which the hinge arm (1) is seated when in the first position.

8. (Amended) A hinge connection according to claim 6 [or 7], wherein the guide surfaces (22, 231) are planar.

11. (Amended) An electrical cabinet for electronic and electrical components, comprising a hinge connection according to [any of claims 1 to 10] claim 1, and a frame including a frame member (31) including the hinge arm (1) and a removable door panel (32) including the hinge recess (2).



09/889685

HINGE CONNECTION

This invention relates to a hinge connection particularly but not exclusively suited for forming a hinge connection between a frame of an electrical cabinet and a removable door panel thereof.

Electrical cabinets generally comprise a frame for receiving sub-racks of electrical and electronic components, and other items such as cooling fans. The frame is clad in side panels and an openable door panel. These panels are usually removable in order to facilitate the fitting of the components to the frame during initial manufacture, and also to facilitate in-use servicing of the components. The cabinet can be quite tall (typically 2 metres) and therefore the removable door panel can be quite bulky and also quite heavy, and is accordingly sometimes difficult for a person to position accurately when trying to fit the door panel onto the frame by aligning the hinge pins of the frame with hinge holes formed in the door panel.

According to a first aspect of the present invention, there is provided a hinge connection comprising:

a hinge arm at the end of which is a hinge pin; and

a hinge recess having a corner for guiding the hinge arm to a first position at which the hinge arm is seated in the corner and from which the hinge arm is slidable relative to the hinge recess along the corner to a second position to insert the hinge pin into a hinge hole of the recess whilst unseating the hinge arm from the corner, the end of the pin being chamfered such that, during the movement from the first position to the second position, the chamfer guides the hinge arm out of seated engagement with the corner of the recess.

Because the corner of the hinge recess guides the hinge arm to the first position, it becomes easier to fit a door panel incorporating the hinge recess onto a cabinet frame incorporating the hinge arm. Usually, the operator needs only to achieve general approximate alignment of the hinge arm with the hinge recess, before pressing the door panel with the hinge recess onto the hinge arm to achieve the necessary correct alignment represented by the first position. The operator may then release the weight of the door panel and the weight of the door panel will cause it to

drop downwards, producing movement from the first position to the second position at which the hinge pin is correctly received in the hinge hole. During this movement, the hinge arm that was previously seated in the corner is unseated therefrom, so that during use of the hinge there will be no unwanted frictional rubbing of the hinge arm on the corner of the hinge recess. Thus, the seating function of the hinge arm in the
5 recess is provided only when it is needed (during assembly of the hinge connection) and is dispensed with when it is no longer needed (during subsequent use of the hinge connection).

The degree of the chambering of the pin can be matched to the amount of
10 unseating of the hinge arm from the corner that is required.

Whilst in some embodiments the hinge pin itself may be the component of the hinge arm which seats in the corner of the hinge recess, it is preferred that the hinge arm has a spacing member which:

- protrudes radially beyond the hinge pin;
- 15 in the first position is in seated engagement with the corner of the recess whilst spacing the hinge pin away from the corner; and
- in the second position is no longer in seated engagement with the corner.

In many embodiments, the spacing member has a cylindrically curved surface. This surface may be only partially annular, but in many embodiments it may be a
20 complete annulus such that the spacing member has a spacing surface which is circumferentially a complete cylinder.

In some embodiments, the hinge pin will be freely rotatable in a main arm portion of the hinge arm. In other embodiments, the spacing member is integral with the hinge pin and these components are rotatably mounted at the end of a main arm
25 portion of the hinge arm.

According to a further aspect of the present invention, there is also provided an electrical cabinet for electronic and electrical components, comprising a hinge connection as described above and a frame having a frame member at the end of which is the hinge arm and a removable door panel including the hinge recess.

30 A non-limiting embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a hinge arm of a hinge connection in accordance with the present invention;

Fig. 2 is a perspective view of a hinge recess of the hinge connection;

Fig. 3 is a perspective view of the hinge connection when in use, with the
5 hinge arm fitted to a frame of an electrical cabinet and the hinge recess fitted to a removable door panel of the electrical cabinet; and

Fig. 4 is a plan view of the assembled hinge connection, showing the slight unseating that occurs in the second position.

The hinge connection comprises a hinge arm 1 shown in Fig. 1 and a hinge
10 recess 2 shown in Fig. 2 which functions as a socket for receiving the hinge arm 1.

The hinge arm 1 comprises a main arm portion 11 which projects from a base
12 shaped for functioning as an end cap for insertion into the end of a structural frame member of a frame of an electrical cabinet. The main arm portion 11 is curved and at its free end it rotatably carries a pin assembly 13 comprising a shaft 14,
15 a collar 15 and a pin 16. The shaft 14 is rotatably received in a vertical through hole 17 at the free end of the main arm portion 11. The collar 15 rests on the top surface of the main arm portion 11.

The shaft 14, collar 15 and pin 16 are integral with one another so that the pin assembly 13 rotates as a single unit.

20 The hinge recess 2 comprises a box-like body 21 having three main side walls 22, 23 and 24. There are also top and bottom walls 25, 26. Flanges 27 are folded outwardly from the walls 24, 25 and 26. The three flanges 27 lie in a common plane and two of them have apertures 29 to enable the hinge recess 2 to be fitted to a removable door panel.

25 A portion 231 of the side wall 23 is higher than the rest of the base of the body and is linked to the main part of the side wall 23 by a sloping connecting portion 232 of the side wall 23.

A hinge hole 28 is provided in the top wall 25.

During insertion of the hinge arm into the hinge recess, the operator needs to
30 aim the hinge arm only generally towards the corner containing the hinge hole 28 because if, as viewed in Fig. 2, the hinge arm 1 is too far over to the left the collar

15 will impact on the inner face of the side wall 22 and be deflected towards the right to end up at a first position at which the pin 16 is generally aligned under the hole 28.

5 If the hinge arm enters the hinge recess too far over to the right, as viewed in Fig. 2, the collar 15 will impact on the side wall portion 231 and be deflected or guided slightly leftwards so that, by the time the collar 15 reaches the bottom of the groove defined by the side wall 22 and side wall portion 231, the pin 16 will be correctly generally aligned under the hinge hole 28.

10 The inner face of the side wall 22 and the inner face of the side wall portion 231 are generally elongate planar surfaces that are orthogonal to one another so as to define the groove into which the collar 15 is seated when the hinge arm reaches a first position in the hinge recess. In this first position, the pin 16 is spaced away from the hinge recess 2.

15 Relative movement is then produced between the hinge arm 1 and hinge recess 2 such that the collar 15 slides along the base of the groove in which it is seated, to start to insert the pin 16 in the hinge hole 28. In the first position, the longitudinal axis of the pin 16 is slightly lower down in the groove than the axis of the hinge hole 28. Consequently, a chambered leading edge 161 of the pin 16 is used to lift the pin 16 slightly up in the groove and into correct alignment with the axis of the hinge hole 28 as the pin proceeds fully into the hole as the hinge arm reaches its second, final position. Because of the lifting action of the leading edge 161, the collar 15 is unseated from the groove defined by the side wall 22 and side wall portion 231. This is so that, in use, there is no unwanted frictional rubbing of the hinge recess 2 against the cylindrical side surface of the collar 15.

25 In the second, final position achieved at the end of the assembly operation, the top wall 25 rests on the top end surface of the collar 15 which thereby acts as a shoulder.

It may be seen that the collar 15 acts a spacing member in the first position, for spacing the pin 16 away from the guide surfaces of the groove in the corner of the hinge recess 2, whilst generally correctly positioning the pin 16 under the hole 28 ready for its insertion into that hole upon movement from the first position to the

30

second position.

The side wall 22, side wall portion 231 and top wall 25 are mutually orthogonal. This is the preferred arrangement. In an alternative, the internal angle between the side wall 22 and side wall portion 231 could be greater or less than 90° as long as the function is achieved of correctly guiding the hinge arm to its first, seated position in the corner of the hinge recess under the hinge hole 28.

Fig. 3 shows how the hinge connection of the present embodiment may be used. The base 12 is inserted into the end of a structural frame member 31 of the frame of an electrical cabinet. The hinge recess 2 is inserted into a side strengthening member 32 of a removable door panel of the electrical cabinet. Thus, in use, the hinge arm 1 will be static and it is the hinge recess 2 which moves relative to the hinge arm 1. Therefore, when moving to the first position, the operator looks to ensure that a pushing motion will generally insert the pin assembly 13 into the corner of the hinge recess under the hinge hole 28. Precise alignment is not required before the pushing operation commences, because the collar 15 will be guided by the side wall 22 and side wall portion 231 to the correct position. Then, the operator can release the weight of the door panel and produce the relative sliding movement from the first position to the second, final position at which the pin 16 is fully received in the hinge hole 28 and the collar 15 has lifted slightly clear from being seated in the corner of the hinge recess.

CLAIMS

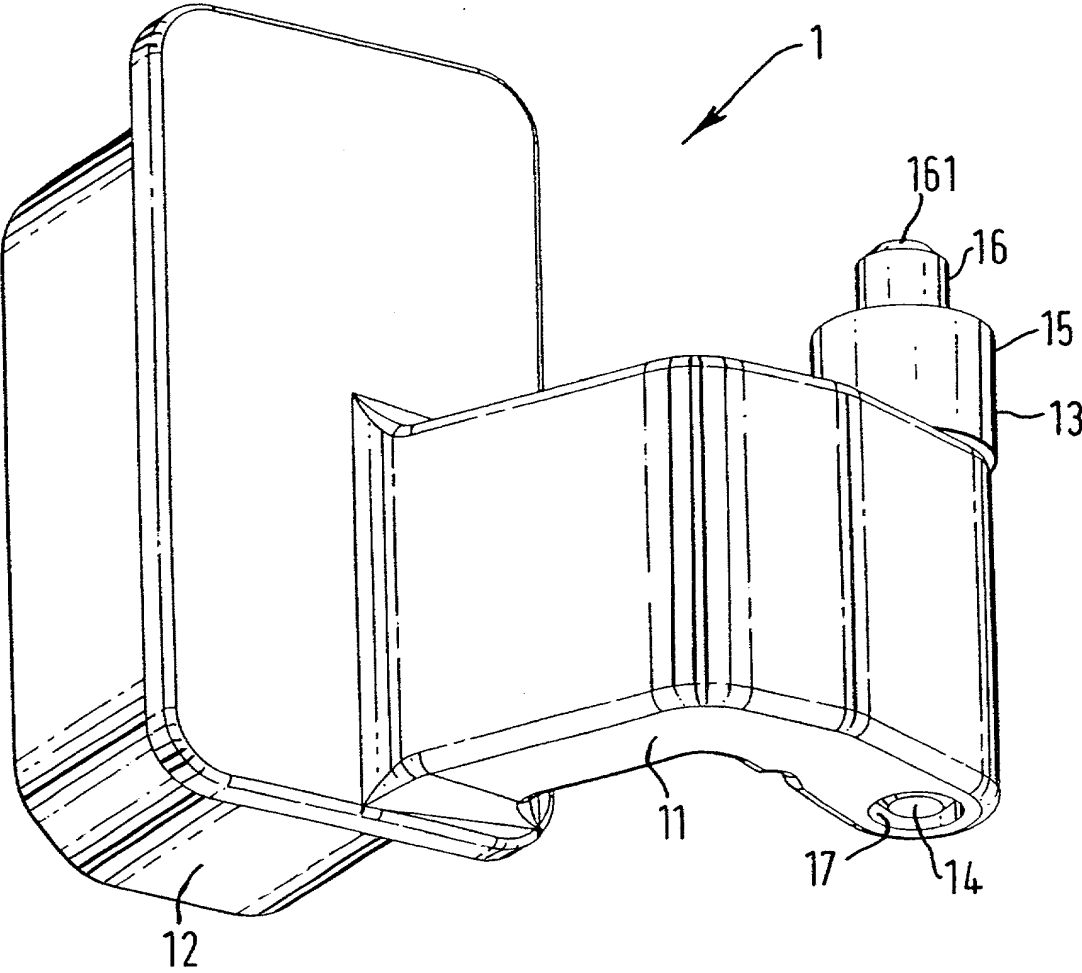
1. A hinge connection, comprising:
a hinge arm (1) including a hinge pin (16) at an end thereof; and
5 a hinge recess (2) including a hinge hole (28) for receiving the hinge pin (16)
and a corner for guiding the hinge arm (1) to a first position in which the hinge
arm (1) is seated in the corner and from which the hinge arm (1) is slidable
relative to the hinge recess (2) along the corner to a second position in which the
hinge pin (16) is inserted in the hinge hole (28);
10 wherein the hinge arm (1) includes a spacing member (15) which protrudes
radially beyond the hinge pin (16), and, in the first position, is in seated
engagement with the corner, with the hinge pin (16) spaced from the corner, and,
in the second position, is spaced from the corner, and the end of the hinge pin
15 (16) includes a chamfer (161) such that, during movement from the first position
to the second position, the chamfer (161) guides the hinge arm (1) out of seated
engagement with the corner.
2. A hinge connection according to claim 1, wherein the spacing member (15) has
a cylindrically curved surface.
20
3. A hinge connection according to claim 2, wherein the spacing member (15) has
a surface which is circumferentially a complete cylinder.
4. A hinge connection according to any of claims 1 to 3, wherein the hinge arm (1)
25 includes a main arm portion (11), and the spacing member (15) and the hinge pin
(16) are integrally formed and rotatably mounted at an end of the main arm
portion (11).
5. A hinge connection according to any of claims 1 to 4, wherein the spacing
30 member (15) is contiguous with the hinge pin (16).
6. A hinge connection according to any of claims 1 to 5, wherein the hinge recess

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(2) includes guide surfaces (22, 231), and the corner is a groove defined by the guide surfaces (22, 231), against which the hinge arm (1) is seated when in the first position.

- 5 7. A hinge connection according to claim 6, wherein the hinge recess (2) includes an end surface (25), and the hinge hole (28) is disposed in the end surface (25) at an end of the groove.
- 10 8. A hinge connection according to claim 6 or 7, wherein the guide surfaces (22, 231) are planar.
9. A hinge connection according to claim 8, wherein the guide surfaces (22, 231) are generally orthogonal.
- 15 10. A hinge connection according to claim 9, wherein the end surface (25) is orthogonal to the guide surfaces (22, 231).
- 20 11. An electrical cabinet for electronic and electrical components, comprising a hinge connection according to any of claims 1 to 10, and a frame including a frame member (31) including the hinge arm (1) and a removable door panel (32) including the hinge recess (2).

ART 34 AMDT



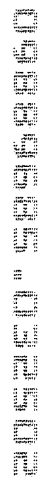
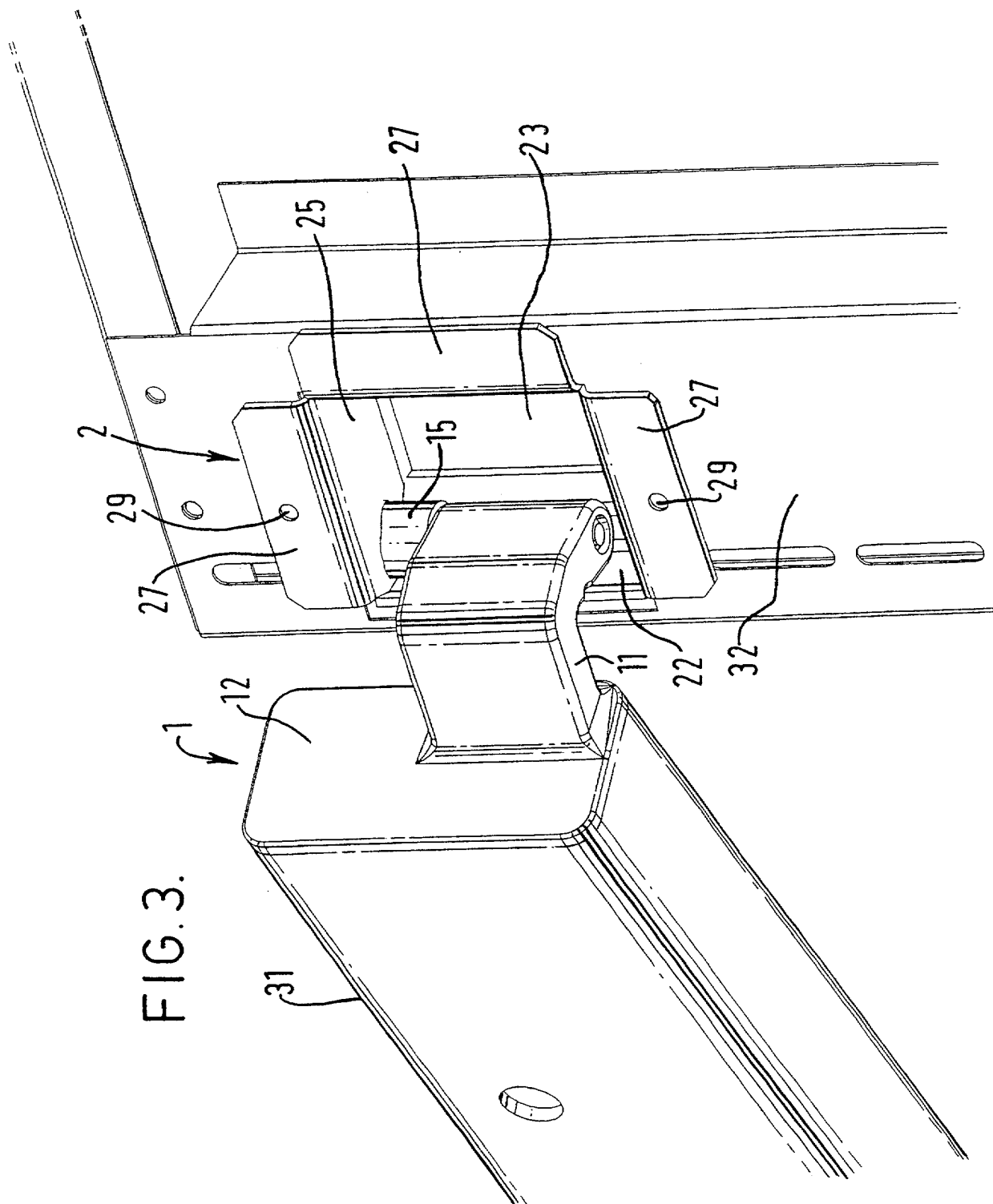
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FIG. 3.



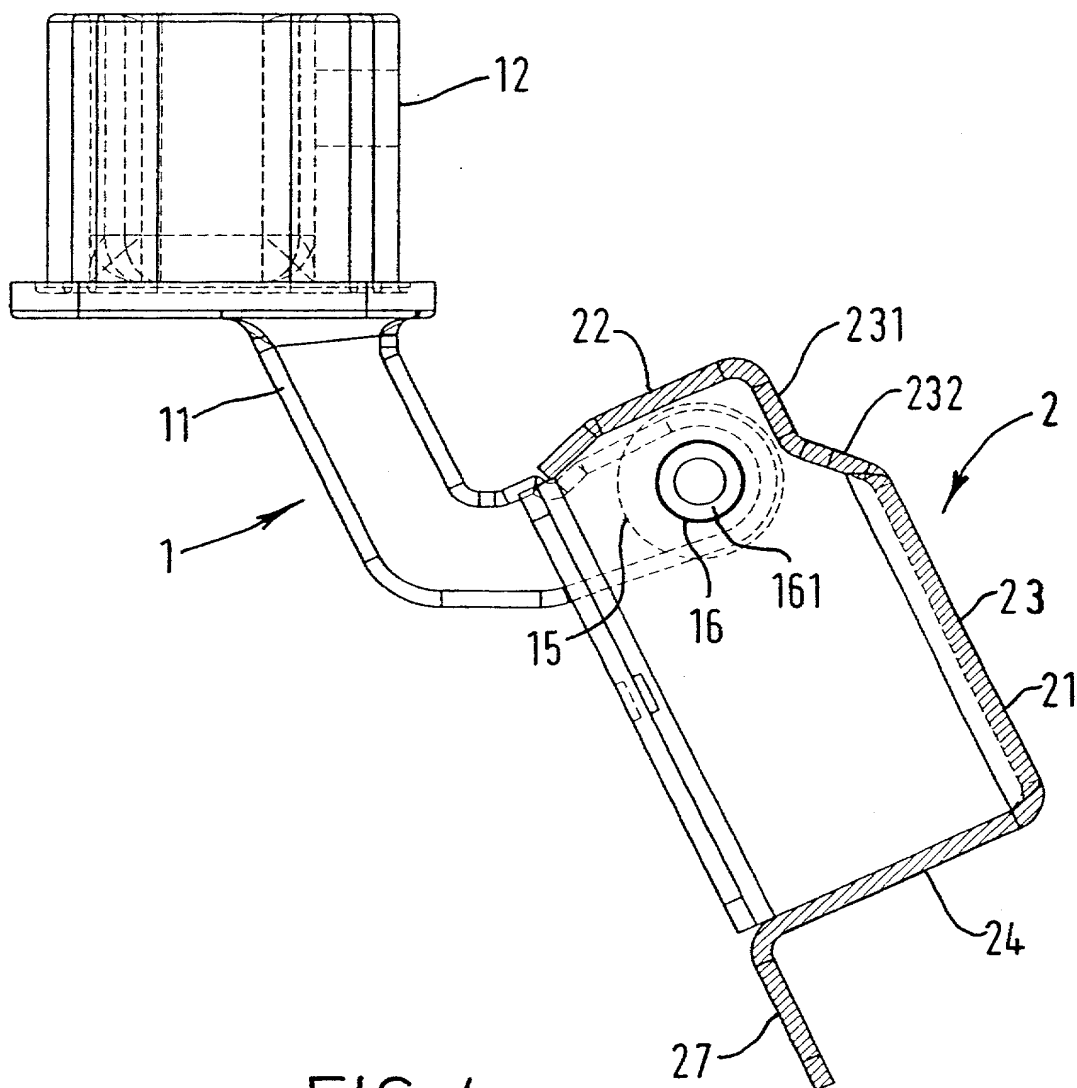


FIG. 4.

Attorney Docket No. DYOUNP0218US

PATENT (OUS)

COMBINED DECLARATION AND POWER OF ATTORNEY
(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT)

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Title: **HINGE CONNECTION**

the specification of which

☐ is attached hereto, or

☒ was filed as United States Application or PCT International Application (give Express Mail label number and deposit date if Application number not yet known):

Application No.: 09/889,685
(Express Mail Label No.)
Filing Date: July 19, 2001
(Deposit Date)
Amended on (if applicable):

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56(a).

PRIORITY CLAIM

I hereby claim priority benefits under Title 35, United States Code, §119 of (i) any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed; and (ii) any United States provisional application(s) that is/are listed below.

☐ no such applications have been filed.
☒ such applications have been filed as follows.

**EARLIEST FOREIGN/PROVISIONAL APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

| COUNTRY | APPLICATION NUMBER | DATE OF FILING (day, month, year) | PRIORITY CLAIMED | |
|---------|--------------------|-----------------------------------|------------------|----|
| | | | Yes | No |
| GB | 9901144.7 | 19 January 1999 | X | |
| | | | | |
| | | | | |

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

09/889,685-032502

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Armand P. Boisselle, Reg. No. 22,381; Warren A. Sklar, Reg. No. 26,373; Don W. Bulson, Reg. No. 28,192

The undersigned to this declaration and power of attorney hereby authorizes the U.S. attorney(s) named herein to accept and follow instructions from

Authorized representative: D. Young & Co., Briton House, Briton Street, Southampton SO14 3EB, United Kingdom

as to any actions to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney(s) and the undersigned. In the event of a change in the person(s) from whom instructions may be taken, the U.S. attorney(s) will be so notified by the undersigned.

Send Correspondence To

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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|---|---|--------------|----------------|
| Full Name of Sole or First Inventor: <u>David Horne</u> | | | |
| Inventor's signature: | <u>[Signature]</u> | Date: | <u>7/03/02</u> |
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CHECK FOR ANY OF THE FOLLOWING ADDED PAGE(S) WHICH FORM A PART OF THIS DECLARATION

- ☐ Signature for additional joint inventors.
- ☐ Added page to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (CIP) application.
- ☒ This declaration ends with this page.